Pre-implant Computed Tomography And Insertion Torque Measurement in Qualitative Determination of Trabecular Bone Density

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Abstract

Bone density is a very important factor in the successful plan of implant treatment. The aims of the study are to evaluate the trabecular bone density of potential dental implant sites in different region of the jawbone by using Computerized Tomography (CT) and the relationship between bone density and insertion torque .To establish a lower threshold value of bone density for early loading protocols.

64 patients were treated with 120 Xive FRIADENT DENTPLY system implants. The implant recipient sites were divided in two groups according to gender; 60 in males and 60 in females and each group was divided into subgroups according jaw(maxilla and mandible) and region (anterior and posterior). The bone density of each implant recipient site was recorded in Hounsfield units (HU) using CT. The maximum insertion torque (Ncm) values were recorded with torque controlling motor. Implant stability was measured by Ratchet torque.

There was a significant correlation between bone density and insertion torque in males ($r=0.983$, $p<0.001$) and females ($r=0.955$, $p<0.001$).The trabecular bone density values were (682±98 HU, 481±104 HU, 413±92 HU, and 263±67 HU) values in the anterior mandible, posterior mandible, anterior maxilla, and posterior maxilla, respectively. Trabecular bone density was higher in males in comparison to females and the bone quality was higher for the mandible than for the maxilla, and higher for the anterior region than for the posterior region of these bones. In addition, primary implant stability was higher for dental implants placed in the mandible than for those in the maxilla, particularly in the anterior region. For bone density no significant difference ($p<0.05$) between the posterior mandible and anterior maxilla in female and between males and females at posterior maxilla ($p<0.001$).